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(54) COMPOSITION AND PROCESS FOR PRODUCING AQUARIUM WATER
 HAVING IMPROVED PROPERTIES

(71) I, ULRICH BAENSCH, of Herren-
 teich, D-452 Melle, Germany; a German
 national, do hereby declare the invention,
 for which I pray that a patent may be granted
 to me, and the method by which it is to be
 performed, to be particularly described in
 and by the following statement:—

The present invention relates to a process
 for producing aquarium water having im-
 proved properties and furthermore to com-
 positions for addition to aquarium water to
 produce such improved properties.

By "aquarium" as used throughout the
 specification and claims, there is to be in-
 cluded conventional containers which are
 open at the top and provided with glass side
 panels, as well as other containers, such as
 breeding and transporting containers. The
 water produced in accordance with the pre-
 sent invention is suitable for all such con-
 tainers. Moreover, such aquarium water is
 intended to provide advantages for all kinds
 of fish and for lower order animals.

Experience gained due to mishaps and
 losses of fish has taught aquarium owners to
 pay particular attention to the aquarium
 water, particularly when transferring or
 transporting fish and when changing and
 treating the water. It is known that the
 cause of mishaps is often to be found in the
 different characteristics of the aquarium
 water.

It is an object of the present invention to
 provide a process for producing aquarium
 water which has improved properties which
 eliminate or substantially reduce the risks
 when transferring fish from one container to
 another or when changing the water without
 having first to filter the water.

According to the present invention there
 is provided a composition for addition to
 aquarium water comprising polyvinylpyrro-
 lidone (PVP) and ethylenediaminetetraacetic
 acid (EDTA) or the sodium salt of ethylene-
 diaminetetraacetic acid (EDTA-Na) in a
 ratio of 1.5:1 to 3:1. Preferably, the ratio
 of PVP to EDTA or EDTA-Na is 2:1.

Also according to the present invention
 there is provided a process for producing

aquarium water having improved properties,
 wherein polyvinylpyrrolidone (PVP) and
 ethylenediaminetetraacetic acid (EDTA) or the
 sodium salt of ethylenediaminetetraacetic
 acid (EDTA-Na) are added to the water in-
 tended for the aquarium in a ratio in the
 range of 1.5:1 to 3:1, namely in an amount
 which will ensure that the formation of a
 stable foam is prevented. Preferably, the
 ratio of PVP to EDTA or EDTA-Na is 2:1.

The addition of such compounds ensures
 that free ions, more especially certain
 cations, in the water are prevented from hav-
 ing a harmful effect on the mucous mem-
 brane and gills of the fish. By the addition
 of EDTA the free metal ions form chelate
 complexes therewith and hence are rendered
 harmless. This substantially increases the
 well being of the fish, the toxicity of PVP
 is overcome; hence the EDTA has a clear
 detoxicating action.

The polyvinylpyrrolidone (PVP) used is
 preferably selected from PVP having a mole-
 cular weight of about 11,500, 40,000 or
 200,000. For the above active substance
 combination preferably PVP with a molecul-
 ar weight of 11,500 to 40,000 is used in
 a ratio of about 1:1 with the EDTA.

In place of EDTA the sodium salt of
 ethylenediaminetetraacetic acid may be used
 — hereinafter called EDTA-Na — in order
 to permit the improved water-solubility
 thereof to be utilised.

To obtain particularly good results it is
 expedient to adapt the components of the
 active ingredient composition to the differ-
 ent requirements of the aquarium water hav-
 ing regard to the intended application there-
 of.

For a fresh water aquarium, provided with
 soil and plants therein the following concen-
 trations are suitable and preferable: 2–10
 ppm (parts per million), preferably 5 ppm,
 of PVP
 and

1–5 ppm, preferably 3 ppm of EDTA-Na.

This dosage is particularly recommended
 when only partially changing the aquarium
 water, and can be varied within the speci-

fied limits depending upon the quantity of fresh water added to the remaining water.

For aquaria which do not have soil or plants therein, maximum effects are obtained with the following concentrations:

6—15 ppm, preferably 10 ppm, of PVP

and

2—8 ppm, preferably 4 ppm, of EDTA-Na.

This concentration also provides a maximum effect when transporting fish or the like.

For the production of sea water aquaria, it is advisable to place closer limits on the concentrations of the active ingredients.

Taking into account the foaming and the maintaining of the microorganisms, the following concentrations have proved extremely useful:

3—5 ppm, preferably 4 ppm, of PVP

and

1—3 ppm, preferably 2 ppm of EDTA-Na.

This applies both for the preparation of a completely fresh supply of water as well as to partial changing of the water. It is

however, advantageous to double the aforesaid concentrations preferably used if the container is to be used to transport seawater animals; in this case taking into consideration that maintaining the microorganisms may only play a subordinate part.

The aforesaid active ingredient combinations may be further improved by the addition of certain further compounds.

Hence, for placing fish in chlorinated, fresh tap water, an addition of 2—6 ppm, preferably 4 ppm of sodium thiosulphate or potassium thiosulphate has proved to be favourable. After a short time, the fish start eating and relatively early return to their natural colour. This can be observed both in fresh water and seawater.

One of the causes of impairing the well-being of fresh water fish and which can lead to losses is the fluctuation of the pH value in an alkaline sense, which may have various causes. The adverse effect of the pH value in an alkaline sense results especially from the displacement of the quantity ratio ammonium/ammonia in the direction of extremely poisonous ammonia. Proceeding from this knowledge, a pH buffer is to be proposed on account of the invention which even in waters having a certain carbon hardness prevents or decelerates any increase of the pH value beyond the original value of the tap water or well water. Tests have shown that mono-potassium phthalate conforms well to these requirements, which in addition promotes the growth of water plants and algae and causes no turbidity of the water by the forming of insoluble calcium compounds. 2—6 ppm has been found as maximum dosage in connection with the aforesaid active ingredient combinations.

Particularly expedient hence is a stock

solution comprising: 10 g. PVP, 6 g. EDTA-Na and 20 g. mono-potassium phthalate made up to 1000 ml with H₂O.

This stock solution is used in a ratio of 1 part to 2000 parts of aquarium water and has a pH of 4.0. With this acid pH value the stock solution may be effectively preserved with the aid of known preserving agents such as the sodium salt of ethyl-4-hydroxybenzoic acid or of propyl-4-hydroxybenzoic acid, butylated hydroxyanisole, sorbic acid or hexamethylene-tetramine.

The invention moreover opens up the possibility of a particularly favourable vitamin addition, thus in the form of aneurin hydrochloride (vitamine B₃), preferably in an amount of 1—3 ppm. A positive effect on the fish is surprisingly shown; the fish show a natural and fine colouring and increased inclination to eat. The readiness to spawn of the fish of the family of *Rasbora heteromorphia*, may be substantially increased. The sensitivity of the *Aphyosemion*-species against unfavourable water conditions was substantially diminished or moderated. Hence an addition of the said active ingredient combinations of

2 ppm Aneurinhydrochloride (vitamin

B₃),

0.2 ppm Lactoflavin (vitamin B₂),

1 ppm (vitamine B₆).

has proved to be very favourable; the aforesaid species of fish, which can be propagated successfully in slightly acid water may be bred without losses from young fish to breeding fish which in turn could lead to a remarkably productive spawning. The young fish obtained show a good and uniform growth. For these tests the following species were investigated in particular: *Aphyosemion Qustrale* and *Aphyosemion gardenieri*.

A number of therapeutic agents which act against ectoparasitic stimulants of fish are particularly risky to use, because the lethal dose effective against the diseases is similar to the lethal dose for the fish.

With the highly diverse nature of waters used for fish care, the use of these agents in some cases leads to unforeseeable effects. An important feature herein, however, is that before administering a therapeutic agent, the said active ingredient combination PVP and EDTA is used. This prevents undesired effects. This knowledge may be realised with the following active ingredients:

2—4 ppm of 2-ethoxy-6,9-diaminoacridine-DL-lactate, 6—8 ppm of Malachite green together with the aforesaid active ingredient combination.

It has been found very successful in the fish species *Bedotia geayi* and *Thayeria boehlkei*, which are normally very sensitive to Rivanol. The same applies to the sensi-

tivity of the fish species *Labeo bicolor* and *Botia macrantha* against the Malachite green, which is known *per se* to kill the germ of the fish disease *Ichthyophthirius multifiliis*.

WHAT I CLAIM IS:—

1. A composition for addition to aquarium water comprising polyvinylpyrrolidone (PVP) and ethylenediaminetetraacetic acid (EDTA) or the sodium salt of ethylenediaminetetraacetic acid (EDTA-Na) in a ratio of 1.5:1 to 3:1.
2. A composition as claimed in claim 1, in which the ratio of PVP to EDTA or EDTA-Na is 2:1.
3. A composition as claimed in claim 1 or 2 additionally containing sodium thiosulphate and/or potassium thiosulphate.
4. A composition as claimed in any preceding claim, additionally containing monopotassium phthalate.
5. A composition as claimed in claim 4, comprising 10g PVP, 6g of EDTA-Na and 20g of mono-potassium phthalate made up to 1000 ml with H₂O.
6. A composition as claimed in any preceding claim additionally containing one or more of the following: aneurinhydrochloride (vitamin B₁), lactoflavin (vitamin B₂), vitamin B₆, 2-ethoxy-6,9-diaminoacridine-DL-lactate and Malachite green.
7. A composition for addition to aquarium water as claimed in claim 1, substantially as hereinbefore described.
8. Aquarium water containing a composition as claimed in any one of claims 1 to 7.
9. Aquarium water as claimed in claim 8, more particularly for an aquarium provided with soil and plants therein, comprising 2–10 ppm of PVP and 1–5 ppm of EDTA-Na.
10. Aquarium water as claimed in claim 9, comprising 5 ppm of PVP and 3 ppm of EDTA-Na.
11. Aquarium water as claimed in claim 8, more particularly for an aquarium not containing soil or plants, comprising 6–15 ppm of PVP and 2–8 ppm of EDTA-Na.
12. Aquarium water as claimed in claim 11, comprising 10 ppm of PVP and 4 ppm of EDTA-Na.
13. Aquarium water as claimed in claim 8, more particularly for a seawater aquarium, comprising 3–5 ppm of PVP and 1–3 ppm of EDTA-Na.
14. Aquarium water as claimed in claim 13, comprising 4 ppm of PVP and 2 ppm of EDTA-Na.
15. Aquarium water as claimed in any

one of claims 9 to 14 additionally including 2–6 ppm of sodium thiosulphate and/or potassium thiosulphate.

16. Aquarium water as claimed in claim 15, comprising 4 ppm sodium thiosulphate and/or potassium thiosulphate.

17. Aquarium water as claimed in any one of claims 9 to 16 additionally including 2–6 ppm of mono-potassium phthalate.

18. Aquarium water as claimed in claim 17, comprising 4 ppm of mono-potassium phthalate.

19. Aquarium water as claimed in any one of claims 9 to 18 additionally comprising 1–3 ppm of aneurinhydrochloride.

20. Aquarium water as claimed in claim 19 comprising 2 ppm of aneurinhydrochloride (vitamin B₁), 0.2 ppm lactoflavin (vitamin B₂) and 1 ppm vitamin B₆.

21. Aquarium water as claimed in any one of claims 9 to 20 additionally comprising 2–4 ppm of 2-ethoxy-6,9-diaminoacridine-DL-lactate and 6–8 ppm of Malachite green.

22. Aquarium water as claimed in any one of claims 9–21, substantially as hereinbefore described.

23. A process for producing aquarium water having improved properties, wherein polyvinylpyrrolidone (PVP) and ethylenediaminetetraacetic acid (EDTA) or the sodium salt of ethylene diaminetetraacetic acid (EDTA-Na) are added to the water intended for the aquarium in a ratio in the range of 1.5:1 to 3:1, namely in an amount which will ensure that the formation of a stable foam is prevented.

24. A process as claimed in claim 23, in which the ratio of PVP to EDTA or EDTA-Na is 2:1.

25. A process as claimed in claim 1 or 2, in which the PVP has a molecular weight of about 11,500, 40,000 or 200,000.

26. A process as claimed in claim 23, 24 or 25, in which additional active substances are added to the water after the PVP and EDTA have been added.

27. A process for producing aquarium water having improved properties as claimed in any one of claims 23 to 26 substantially as hereinbefore described.

28. Aquarium water whenever produced by process as claimed in any one of claims 23 to 27.

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